

Claims

1. A method of milking an animal comprising the steps of directing milk collected from the udder of the animal into a metering chamber which is repeatedly filled and emptied during the milking procedure, checking the quality and/or composition of the milk collected in the metering chamber, and counting the number of filling and emptying cycles of the metering chamber, characterised in that during each of at least several cycles of filling and emptying the metering chamber the number of respective filling and emptying cycle is recorded, a milk sample is removed from the metering chamber for analysis, and/or at least one property of the milk in the metering chamber is sensed and recorded, the at least one property including electrical conductivity, a light absorption characteristic and/or temperature.
2. A method according to claim 1, wherein milk samples are removed from the metering chamber and analysed to determine the somatic cell count, fat content, protein content, urea content and/or enzyme (e.g. NAGase) content.
3. A method according to claim 1, wherein the milk sample is withdrawn from the metering chamber through a tube.
4. A method according to claim 3, wherein the tube is a suction tube extending downwardly into the metering chamber.
5. A method according to claim 1, wherein electrical conductivity of the milk is sensed by electrodes carried by a probe extending into the metering chamber.

6. A method according to claim 1, wherein a light absorption characteristic of the milk is sensed by a light source and light detector carried by a probe extending into the metering chamber.
7. A method according to claim 6, wherein electrodes, the light source and the light detector are carried by the same probe.
8. A method according claim 6, wherein the light source comprises a light emitting diode and the light detector comprises a photocell.
9. A method according to claim 6, wherein a suction tube for withdrawing a milk sample is incorporated in the probe.
10. A method according to claim 1, wherein properties of the milk in the metering chamber are sensed by sensors carried by two or more probes extending into the metering chamber.
11. A method according to claim 1, wherein recorded values relevant to the quality/composition of the milk collected in the metering chamber during a selected filling and emptying cycle are compared with the corresponding recorded values related to milk collected in the metering chamber during a corresponding filling and emptying cycle during a previous milking of the animal.
12. A method according to of claim 1, wherein the recorded values relevant to the quality/composition of the milk collected in the metering chamber during a selected filling and emptying cycle are compared with the corresponding recorded values relating to milk collected in the metering chamber during an earlier filling and emptying cycle during the milking procedure.

13. A method according to claim 1, wherein the emptying of the metering chamber is commenced when a predetermined amount of milk has collected therein, the predetermined amount being not more than about 1 litre or about 0.5 kg.
14. A method according to claim 1, wherein emptying of the metering chamber is commenced when the amount of milk collected therein reaches a value in the range of from 20g to 400g.
15. A method according to claim 14, wherein the emptying of the metering chamber is commenced when the amount of milk collected therein reaches a value in the range of from 50g to 150g.
16. A method according to claim 13, wherein the predetermined amount is selected in dependence upon the rate of flow of milk into the metering chamber.
17. A method according to claim 1, wherein the time of milking is recorded and the interval since the immediately preceding milking of the animal is recorded.
18. A method according to claim 1, wherein the frequency of the filling and emptying cycles during which a milk sample is taken and/or milk property values are sensed and recorded is selected in dependence upon the results of the analysis of a sample taken and/or the milk property values sensed and recorded during a previous milking of the animal.

19. A method according to claim 1, wherein the frequency of the filling and emptying cycles during which a milk sample is taken and/or milk property values are sensed and recorded is selected in dependence upon the results of the analysis of a sample taken from the metering chamber and/or milk property values sensed and recorded during the milking procedure.
20. A method according to claim 1, wherein a milk sample is taken and/or milk property values are sensed and recorded during each filling and emptying cycle during at least part of the milking procedure.
21. A method according to claim 1, wherein the milk samples are removed from the metering chamber and are delivered directly to an analyser for analysis.
22. A method according to claim 1, wherein the milk samples removed from the metering chamber are delivered into sample collection containers and taken to a laboratory for analysis.
23. A method according to claim 1, wherein milk collected from respective teats of the udder of the animal is directed to respective milk metering chambers.
24. A method according to claim 23, wherein recorded values relevant to the quality/composition of the milk collected in the metering chambers connected to the respective teats of the animal are compared.
25. A milk metering apparatus comprising a metering chamber into which milk from an udder of an animal is delivered in the course of milking the animal, the metering chamber having a milk inlet and a milk outlet for repeated

filling and emptying of the metering chamber during the milking procedure, the number of filling and emptying cycles being counted for determination of the milk quantity, and a sampling duct communicating with the interior of the metering chamber for removal of milk samples from the metering chamber during respective filling and emptying cycles.

26. An apparatus according to claim 25, wherein an analyser is connected to the milk sampling duct for receiving and analysing samples removed from the metering chamber.

27. An apparatus according to claim 26, wherein the analyser is operable to analyse the milk determining the somatic cell count, fat content, protein content, urea content and/or enzyme (e.g. NAGase) content.

28. An apparatus according to claim 25, wherein a sample collecting device is connected to the milk sampling duct for milk samples removed from metering chamber to be collected in sample containers.

29. An apparatus according to claim 25, wherein the sampling duct is connected to a suction device operable to remove a sample from the metering chamber by suction through the sampling duct.

30. An apparatus according to claim 25, wherein the sampling duct is formed in a tube extending downwardly into the metering chamber.

31. An apparatus according to claim 25, wherein at least one sensor is provided in the metering chamber for sensing a property of milk in metering chamber, the milk property being electrical conductivity, a light absorption or transmission characteristic and/or temperature.

32. An apparatus according to claim 31, wherein a probe extending down into the metering chamber includes the sampling duct and carries the at least one sensor.
33. A milk metering apparatus comprising a metering chamber into which milk from an udder of an animal is delivered in the course of milking the animal, the metering chamber having a milk inlet and a milk outlet for repeated filling and emptying of the metering chamber during the milking procedure, the number of filling and emptying cycles being counted for determination of the milk quantity, at least one sensor in the metering chamber for sensing a property of the milk in the metering chamber, the milk property being electrical conductivity, a light absorption or transmission characteristic and/or temperature, and recording means which records values of the at least one property sensed for comparison with corresponding sensed and recorded values.
34. An apparatus according claim 31, wherein the at least one sensor comprises electrodes for sensing the electrical conductivity of milk in the metering chamber.
35. An apparatus according to claim 31, wherein the at least one sensor comprises a light emitting device and a light detecting device for sensing a light absorption characteristic of milk in the metering chamber.
36. An apparatus according to claim 35, wherein the light emitting device comprises a light emitting diode and the light detecting device comprises a photocell.

37. An apparatus according to claim 31, wherein a plurality of sensors are located in the metering chamber, and two or more probes extend into the metering chamber and carry the sensors.
38. An apparatus according to claim 31, wherein recording means for recording property values of a milk sample and/or milk in the metering chamber records the number of the filling and emptying cycle during which the sample was removed from the metering chamber and/or the property values were sensed in the metering chamber.
39. An apparatus according to claim 38, wherein the recording means records the time of milking and the interval since the immediately preceding milking of the animal.
40. An apparatus according to claim 31, including control means arranged to control the frequency of the filling and emptying cycles during which a milk sample is removed from the metering chamber through the sampling duct and/or of milk property values are sensed and recorded.
41. An apparatus according to claim 40, wherein the control means is so arranged that the frequency set by the control means is dependent upon the results of a milk sample taken and/or milk property values sensed and recorded during a previous milking of the animal.
42. An apparatus according to claim 40, wherein the control means is so arranged that the frequency set by the control means is dependent upon the results of analysis of a milk sample taken and/or milk property values sensed and recorded during the same milking of the animal.

43. An apparatus according to claim 25, wherein the metering chamber is defined within a measuring container supported by a weighing device, and means are provided to cause removal of a sample from the metering chamber via the sampling duct in response to a signal from the weighing device.
44. An apparatus according to claim 43, wherein the weighing device comprises a strain gauge on which the measuring chamber is supported.
45. An apparatus according to claim, wherein the metering chamber has a milk collecting capacity not greater than 1 litre or 0.5kg.
46. An apparatus according to claim 45, wherein the milk collecting capacity of the metering chamber is in the range of 20 to 400g, preferably 50 to 150g.
47. An apparatus according to claim 25, wherein a plurality of metering chambers are provided and are connected to respective teat cups.
48. An apparatus according to claim 47, including means to compare recorded values relevant to the quality/composition of the milk collected in the respective metering chambers.
49. An apparatus according claim 33, wherein the at least one sensor comprises electrodes for sensing the electrical conductivity of milk in the metering chamber.
50. An apparatus according to claim 33, wherein the at least one sensor comprises a light emitting device and a light detecting device for sensing a light absorption characteristic of milk in the metering chamber.

51. An apparatus according to claim 50, wherein the light emitting device comprises a light emitting diode and the light detecting device comprises a photocell.
52. An apparatus according to claim 33, wherein a plurality of sensors are located in the metering chamber, and two or more probes extend into the metering chamber and carry the sensors.
53. An apparatus according to claim 33, wherein recording means for recording property values of milk in the metering chamber records the number of the filling and emptying cycle during which the property values were sensed in the metering chamber.
54. An apparatus according to claim 53, wherein the recording means records the time of milking and the interval since the immediately preceding milking of the animal.
55. An apparatus according to claim 33, including control means arranged to control the frequency of the filling and emptying cycles during which milk property values are sensed and recorded.
56. An apparatus according to claim 55, wherein the control means is so arranged that the frequency set by the control means is dependent upon the results of a milk sample taken and/or milk property values sensed and recorded during a previous milking of the animal.
57. An apparatus according to claim 55, wherein the control means is so arranged that the frequency set by the control means is dependent upon the

milk property values sensed and recorded during the same milking of the animal.